Upper Pliocene Fan 1 Play
UP F1, #0981
Buliminella 1

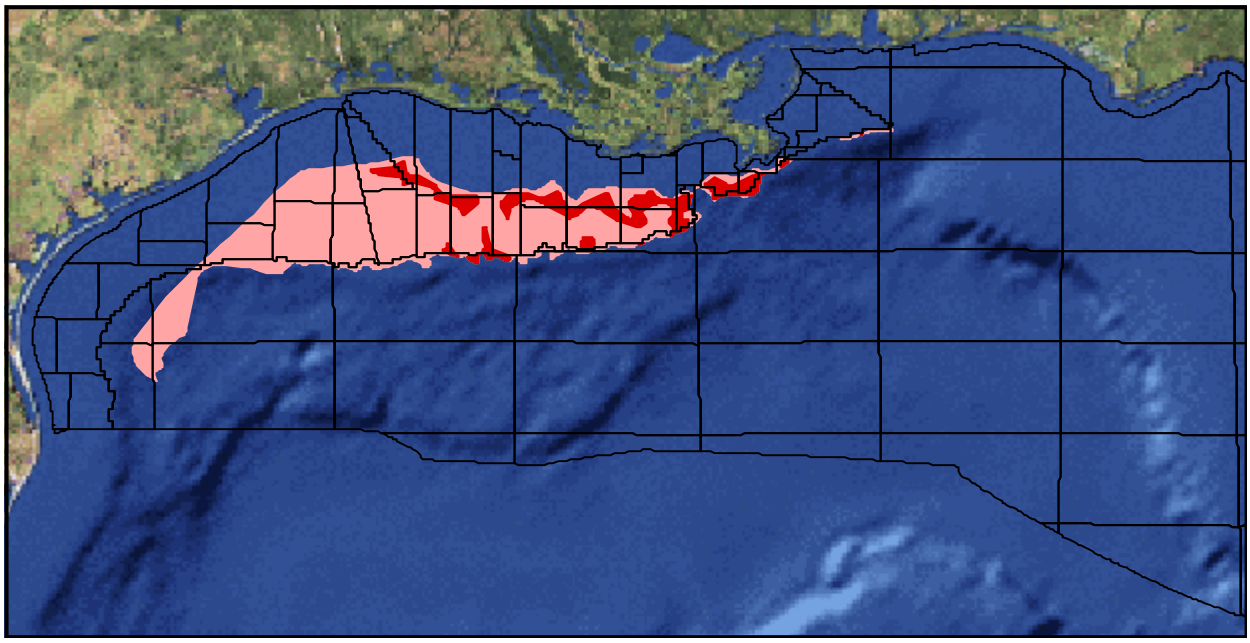

Figure 176. UP F1 map showing location of play. Play limit shown in light red; hydrocarbon limit shown in dark red.

Overview

The Upper Pliocene Fan 1 Play (UP F1) contains reserves of 3,945.819 Bcfg and 335.926 MMbo (1,038.029 MMBOE) in 206 sands in 51 fields. Comparing the 15 F1 fan plays in the GOM, UP F1 ranks second in oil reserves (20%) and gas reserves (15%). The play extends discontinuously from the Corpus Christi/Port Isabel to Viosca Knoll Area (Figure 176).

Description

UP F1 is defined by (1) a deep-sea fan depositional style representing sediments deposited basinward of the UP shelf edge, (2) an extensional structural regime with salt-withdrawal basins and extensive listric, growth faulting rooting into salt detachments on the modern GOM shelf, and (3) the UP Chronozone, the top of which is defined by the *Buliminella* 1 biozone (Figure 8).

UP F1 extends discontinuously from the Corpus Christi/Port Isabel Area offshore Texas, along and updip from the modern GOM shelf edge to the Viosca Knoll Area east of the modern Mississippi River Delta (Figure 176). Hydrocarbons have been encountered in much of that same area except for two notable areas. First, there are no hydrocarbon discoveries offshore Texas because of an apparent lack of shelf source sands during UP time. Second, in the offshore Louisiana area, there is a gap in hydrocarbon discoveries across the southern regions of the West Cameron through South Timbalier Areas. This gap represents an area where numerous, allochthonous salt bodies interrupt the deltaic sedimentary section and outlines an area of potential UP subsalt discoveries.

The ancestral Mississippi River Delta System dominated deposition of the play's sediments. The depocenter present in the offshore Texas area no longer received significant amounts of sand-rich sediments during UP time (Morton et al., 1985). As compared with the LP Chronozone, the shelf edge offshore Louisiana of the UP Chronozone occurs farther out in the GOM Basin because of the basinward progradation of the ancient delta systems.

Play Limits

The play is bounded by the shelf edge associated with the *Buliminella* 1 biozone and grades into the sediments of the Upper Pliocene Progradational Play (UP P1) in an updip direction. To the northeast, UP F1 deposits grade into the sediments of UP P1 and the Upper Pliocene Fan 2 Play (UP F2). UP F1 does not extend farther to the west or southwest because of an apparent lack of shelf source sands in offshore Texas during UP time. Downdip, UP F1 is limited by UP F2.

Depositional Style

UP F1 is characterized by deep-sea fan systems deposited basinward of the UP shelf edge. Component facies include channel/levee complexes, sheet-sand lobes, interlobe/fringe sediments, and slump sediments that were deposited on the UP upper and lower slope in topographically low areas between salt structure highs, and abyssal plain. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

The UP deep-sea fan interval varies from less than 50 to more than 8,800 ft in thickness, with net sand thicknesses as much as approximately 800 ft. Sand-dominated successions comprising deposits of multiple sheet-sand lobes can be nearly 1,000 ft thick, with intervening shale sequences reaching as much as several thousands of feet in thickness. Thick, upward-coarsening and thinner, upward-fining log patterns of sand-dominated intervals represent sheet-sand lobe progradation and channel fill/abandonment, respectively, in proximal-fan areas. Interstratified shales are typically only a few hundred feet thick and suggest deposition in distal-fan areas.

Structural Style

Nearly one-half of the fields in UP F1 are structurally associated with salt diapirs—shallow, intermediate, and deep depths—with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Other common structures are anticlines and normal faults. Less common structures in the play are growth fault anticlines, plus a few fields contain hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes.

Quantitative Attributes

On the basis of reserves calculations, UP F1 is 68% gas and 32% oil. The 206 sands in the play comprise 404 reservoirs, of which 196 are nonassociated gas, 164 are undersaturated oil, and 44 are saturated oil. All reserves are proved and estimated to be 3,945.819 Bcfg and 335.926 MMbo (1,038.029 MMBOE) (Table 81). These reserves account for 20% of the reserves for the UP Chronozone.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	206	335.926	3,945.819	1,038.029
Cum. production	181	256.896	2,928.500	777.982
Remaining proved	133	79.030	1,017.320	260.047
Unproved	0	0.000	0.000	0.000

Table 81. UP F1 reserves and cumulative production.

Cumulative production from UP F1 totals 2,928.500 Bcfg and 256.896 MMbo (777.982 MMBOE) from 181 sands in 47 fields. UP F1 production accounts for 20% of the UP Chronozone's total production. Remaining proved reserves in the play are 1,017.320 Bcfg and 79.030 MMbo (260.047 MMBOE) in 133 sands in 41 fields.

Table 82 summarizes that water depths of the fields in UP F1 range from 71-635 ft, and play interval discovery depths vary from 6,400-17,250 ft, subsea. Additionally, porosity and water saturation range from 17-36% and 16-64%, respectively.

206 Sands	Min	Mean	Max
Water depth (ft)	71	224	635
Subsea depth (ft)	6,400	12,361	17,250
Reservoirs per sand	1	2	10
Porosity	17%	28%	36%
Water saturation	16%	28%	64%

Table 82. UP F1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

UP F1 has a 38-year history of discoveries (Figure 177). The first sands in the play were discovered in 1961 and 1962 in the Ship Shoal 208 Field. The maximum number of sands discovered in any year occurred in 1967 with 18 sands from seven fields. However, the maximum yearly reserves of 153.931 MMBOE were added in 1978 with the discovery of 6 sands from three fields. Sand discover-

ies per year appear bimodal with peaks in the late-1960's and 1990's.

The largest sand in the play was discovered in 1978 in the South Pass 89 Field and is estimated contain 132.675 MMBOE (Figure 178). Other than this one sand, no other sand in the play contains more than 50 MMBOE. The mean sand size for the play is 5.039 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 34 sands have been discovered, the largest of which is estimated to contain 9.719 MMBOE.

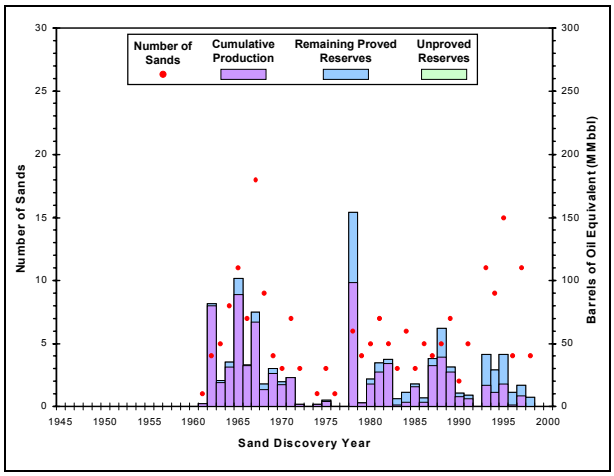

Figure 177. UP F1 exploration history graph showing reserves and number of sands discovered by year.

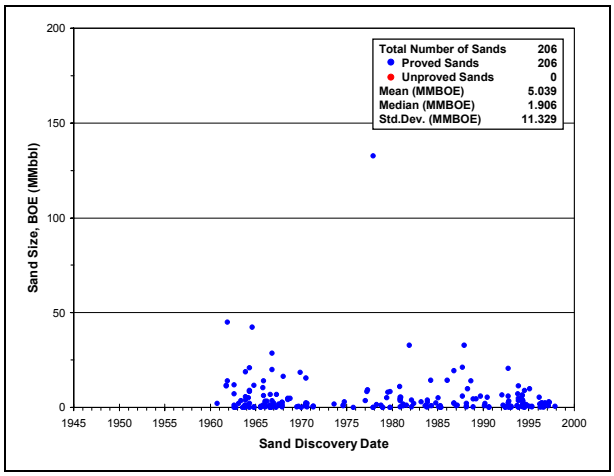

Figure 178. UP F1 sand discovery graph showing the size of sands discovered by year.

Production History

UP F1 has a 36-year history of production (Figure 179). Oil and gas production curves are very similar, both beginning in 1963. After initial yearly increases culminating in local peaks in 1971, production values generally declined. In the mid-1980's, production values started to trend upward once again, and reached their highest levels ever in the late-1990's. The aforementioned production peaks in 1971 and the late-1990's reflect the bimodal nature of the number of sand discoveries per year (Figure 178).

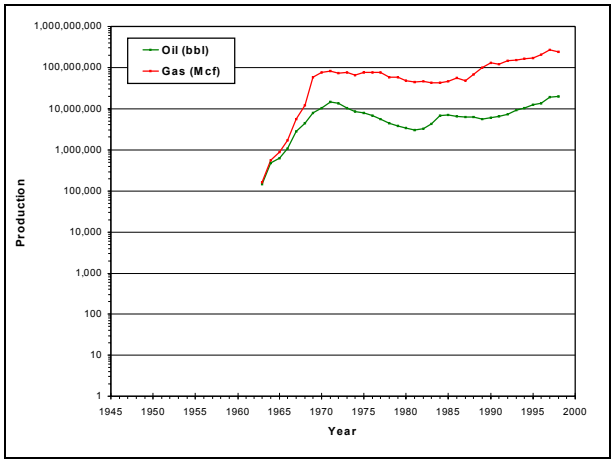

Figure 179. UP F1 production graph showing oil and gas production by year.